

1916 : Confirmation of Einstein's photon theory

Experiment



Robert Millikan (1868 -1953)

- Einstein's photon theory took plank's quantization of light seriously and proposed that energy needed to "free" electrons could be described by

$$E = h\nu - p$$

- Millikan devised an apparatus over a period of ten years to test Einstein's theory. It comprised of an evacuated glass tube with alkali metals mounted on a wheel that moved past a scraper knife. These then became incident to monochromatic light at various frequencies.

- Millikan measured the "Stopping voltage" needed to halt induced current. Plotting this versus frequency he found that the relationship was indeed linear, vindicating Einstein. By measuring the slope he also measured plank's constant to be $h = 6.57 \times 10^{-27}$

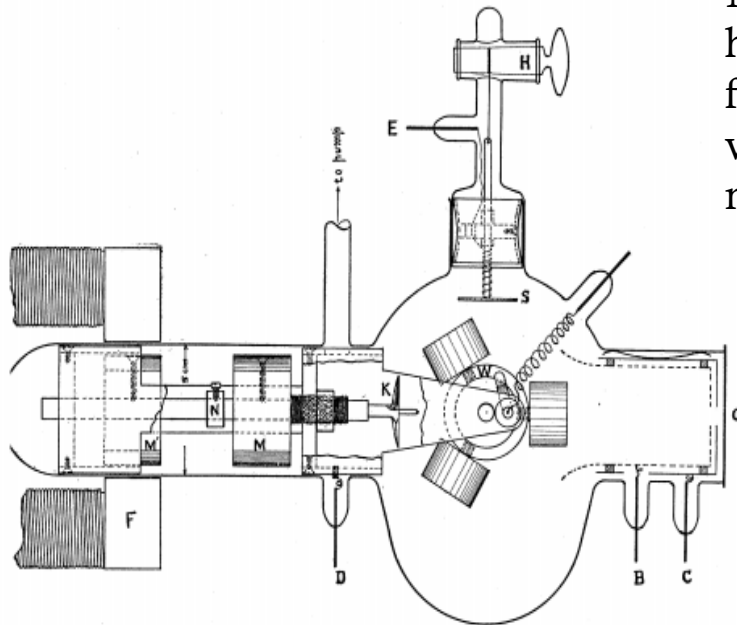


Fig. 2.

Lasting Impact

The verification of Einstein's photon theory cemented quantum nature of light through photons ("corpsicules" as they were then known) and established the foundations for the development of quantum theory. This experiment also won Millikan the Nobel prize in physics in 1923.



Experimental set up